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TECHNICAL REPORT
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**CHEMICAL AND MICROBIOLOGICAL
ANALYSIS OF SLICED, PRECOOKED,
CANNED BACON**

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by
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September 1979

UNITED STATES ARMY
NATICK RESEARCH and DEVELOPMENT COMMAND
NATICK, MASSACHUSETTS 01760



Food Engineering Laboratory

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BACON MOISTURE COOKING FACILITIES CANNED BACON STORAGE STABILITY FIELD TESTS MEAT KITCHEN EQUIPMENT AND SUPPLIES SALT(S)			
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Chemical and physical tests (moisture, salt, protein, fat, ash, pressure and water activity) and microbiological tests (aerobic plate count, yeast and mold, and coagulase positive staphylococci) were conducted on randomly selected samples of canned, precooked bacon. The bacon was produced under contract no. DSA 13H-77C-0673, and the tests were conducted because the total amount of bacon from the contract was rejected for failure to comply with the specified moisture-to-salt ratio. The purpose of the testing was to determine if there			

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was any reason to believe that the bacon was acceptable for its intended purpose. The results of the tests indicated that the bacon was not acceptable. The expected lot average moisture-to-salt ratios did not comply with the specification and coagulase positive staphylococci were found in nine percent of the samples tested.

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PREFACE

Canned precooked bacon is used overseas and afloat and as a component of the standard B Ration. The microbiological safety of the product is dependent upon the moisture-to-salt ratio. The failure of the total quantity of bacon from a recent contract to conform to the moisture-to-salt ratio led to the analysis of the bacon by the U.S. Army Natick Research and Development Command (NARADCOM). The purpose of the extensive laboratory testing was an attempt to determine if there was any reason to believe that the product was acceptable for its intended purpose. This report details the analytical procedures used and the results obtained.

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CHEMICAL AND MICROBIOLOGICAL ANALYSIS

OF SLICED, PRECOOKED, CANNED BACON

INTRODUCTION

Legris traces the history of canned bacon from its development in World War II through the date of his report (1953).¹ He cites conditions, such as long shipping routes and lack of refrigerated storage, kitchen, and cooking facilities as magnifying the unstable characteristics of slab bacon. Food as a morale factor, and bacon in particular, also gave impetus to the development of precooked, canned bacon. The report describes the first canned bacon as not very palatable when eaten from the can or heated without first soaking in water because of the high salt level. The high salt was required to help preserve the product. Parboiling the bacon before frying reduced the saltiness slightly. In 1945 work was initiated by the Quartermaster Food and Container Institute (QMFCI)*, Chicago, IL in cooperation with industry to improve canned bacon. The results of this work led to the first purchase description for canned prefried bacon published in July 1952,² and trial procurements were soon effected. Field testing proved the product to be highly desirable. The first military specification for canned, prefried bacon was published in April 1958.³

¹G. J. Legris, 1953. From frying pan to ration can. Activities Report, third quarter 203, 200-208.

²Quartermaster Corps., 1952. Bacon, Prefried, Canned, Purchase Description. Unnumbered.

³Quartermaster Corps., 1958. Bacon, Sliced, Canned, Prefried, Military Specification 35032.

*Activities of the QMFCI were closed out in the fall of 1963 and transferred to the Food Laboratory and General Equipment and Packaging Laboratory of the U.S. Army Natick Laboratories. These functions now operate as the Food Technology Division and Food Systems Equipment Division of the Food Engineering Laboratory, U.S. Army Natick Research & Development Command (NARADCOM). Authors E. M. Powers is and O. J. Stark (retired) was associated with the Food Microbiology Group, Biological Sciences Division and the Analytical Chemistry Group, Physical Sciences Division, Food Sciences Laboratory, respectively. The Microbiology and Chemistry functions were part of the Food Laboratory until 1974.

Some minor changes in requirements were made in the Military Specification from the Purchase Description, but the basic requirement controlling stability, the moisture-to-salt ratio, (M/S ratio) remained the same; i.e., not more than five parts of moisture to one part of salt, in any individual can. The 5 -to- 1 M/S ratio was not changed in the "A" revision of the specification published in December 1963. The 5 -to- 1 M/S ratio was determined by the Hormel Institute and the USDA as the minimum requirement to assure stability of canned precooked bacon without requiring further heat processing.

The M/S requirements were changed to 4.25 lot average and 4.1 for the range of unit values at the time the "B" revision of MIL-B-35032 was published in September 1968. In the "C" revision, published in June 1974, the requirements were revised in that the range of unit values was now a maximum unit value of 6.0 M/S ratio. This change was made because suppliers could not comply with both the range of unit values and the lot average requirements. The lot average M/S ratio was raised to 4.50 in 1976 and a minimum sample size was set at 13 cans. The lot average M/S ratio was increased to compensate for variances in the amount of lean meat on the bellies.

At a meeting between representatives of Defense Personnel Support Center (DPSC), NARADCOM and a supplier of precooked canned bacon held in August 1976 the unit value M/S ratio was increased to 9.0 but the lot average M/S ratio was stated to be acceptable only if the 99 percent confidence interval of a single tailed "t" test fell below 9.0.

In 1977, seventeen lots (approximately 112,000 twenty-two ounce cans) of sliced, precooked bacon were produced for the Armed Forces under contract number DSA 13H-77-C-0673. All of the finished product was rejected for failure to comply with the M/S ratio.

In consideration of the large amount of bacon involved, NARADCOM agreed to run extensive tests in an attempt to determine if there was any reason to believe the product was acceptable for its intended use. This report compiles the results of those tests.

MATERIALS AND METHODS

Materials. The bacon was obtained from contract number DSA 13H-77-C-0673. The bacon was prepared in accordance with Military Specification MIL-B-35032C as amended. Appendix A outlines the manufacturing methods employed by the supplier.

Methods.

Sampling. Samples for verification testing were randomly drawn from each lot. Thirteen cans from each lot were drawn for testing by the Fort Meade Medical Laboratory, Odenton, MD. An additional twenty-six samples from each lot were randomly drawn for testing by the U.S. Army Natick Research & Development Command (NARADCOM), Natick, MA. All samples were drawn in accordance with sampling plans found in MIL-STD-105.⁴

Thirteen of the twenty-six samples sent to NARADCOM were randomly selected for testing. The remaining thirteen samples were held for additional testing if necessary.

Testing.

Microbiological testing. The bacon was tested for aerobic plate count, yeasts and molds, and coagulase-positive staphylococci. The detailed procedures are outlined in Appendix B. This laboratory also determined the head space pressure.

Chemical testing. Samples of the bacon were tested for percent moisture, salt, and fat by the Fort Meade Medical Laboratory and for percent moisture, salt, protein, fat, ash, and the water activity (A_w) by the NARADCOM Analytical Chemistry Laboratory. The detailed procedures used for the chemical analyses are in Appendix C.

The data obtained from the microbiological and chemical analyses were subjected to mathematical and statistical evaluation. For each lot and for the total data, a correlation matrix was developed, and the expected lot averages were calculated. The expected lot average was calculated as follows:

Mean + (standard deviation X t factor). The t factor for 12 degrees of freedom and t 99 can be found in tables in statistical books such as those of Fisher and Yates (1953)⁵ and Dixon and Massey (1957)⁶. The standard deviation can be calculated by any convenient means.

⁴U.S. Department of Defense. Military Standard MIL-STD-105. Sampling Procedures and Tables for Inspection by Attributes. (1963).

⁵R. A. Fisher and F. Yates. Statistical Tables for Biological, Agricultural, and Medical Research. 4th Edition, Edinburgh, Scotland, Oliver and Boyd, Ltd. 125 pp. (1953).

⁶W. J. Dixon and F. J. Massey, Jr. 1957. Introduction to Statistical Analysis. 2nd Edition New York, McGraw Hill Book Company, Inc. 488 pp. (1957).

RESULTS AND DISCUSSION

Tables 1 through 17 show the results of the microbiological analysis of the bacon. The total aerobic plate count ranged from less than 100 to 3.5×10^7 organisms per gram. Only 15 (6.8 percent) had less than 100 organisms per gram. Fifty-three (24 percent) had in excess of 10^5 organisms per gram; twenty-four (10.8 percent) of the samples contained in excess of 10^6 organisms per gram, and three (1.3 percent) had in excess of 10^7 organisms per gram. Twenty (9 percent) of the samples contained reportable numbers of coagulase-positive staphylococci; i.e., 100 or more organisms per gram. Fifteen (6.8 percent) of the samples contained in excess of 10^3 organisms per gram. Three lots showed a significant correlation between the aerobic plate count and the number of coagulase-positive staphylococci. The method outlined in Chapter 7 (page 192) of Davies (1961)⁷ was used to determine the significance of the correlations.

No attempt was made to assay the samples containing staphylococci for toxin production. However, the fact that coagulase-positive staphylococci in numbers as high as 1.7×10^5 per gram were found was cause for concern. Eleven lots contained one or more samples with reportable numbers of staphylococci. This is approximately 2.8 percent of the total production (212,000 cans).

None of the cans contained reportable numbers of yeast and mold organisms.

Tables 18 through 34 and 35 through 51 show the results of the chemical and physical analyses of the bacon conducted at NARADCOM and Fort Meade, respectively. The specification requires that each can be evacuated to a pressure not greater than 33.8 kPa (20" Hg). Examination of the data from NARADCOM shows that 72 (32.6 percent) of the samples had pressures greater than 33.8 kPa. The correlation (-0.28) between the pressure and the staphylococci count was significant ($P \leq 0.02$) when the data from all samples were used in the calculation. The M/S ratio is the controlling safety requirement for canned precooked bacon. Examination of the data in light of the requirements stated in the introduction showed that only 60 (27.1 percent) of the samples had M/S ratios 9.0 or below. Almost 73 percent of the samples failed to comply with the M/S ratio.

⁷O. L. Davies, editor. Statistical Methods in Research and Production, 3rd Edition New York, Hafner Publishing Company. 396 pp. (1961).

The expected lot average M/S ratio and M/SP Index* were calculated for NARADCOM and the M/S ratio for Fort Meade data. The values reported for each lot from each installation are:

<u>LOT NO.</u>	<u>NARADCOM DATA</u>		<u>FT. MEADE DATA</u>
	<u>M/S RATIO</u>	<u>M/SP INDEX</u>	<u>M/S RATIO</u>
7024	14.54	0.72	15.14
7025	16.79	0.79	17.34
7026	11.61	0.58	14.14
7027	16.15	0.79	15.55
7031	12.87	0.48	13.77
7033	21.48	0.64	14.73
7034	20.46	0.92	18.70
7035	14.80	0.91	16.02
7039	12.38	0.70	14.83
7040	12.05	0.61	14.30
7041	14.75	0.92	13.82
7042	13.26	0.65	11.58
7045	15.51	0.80	12.96
7046	11.92	0.71	17.51
7047	13.42	0.70	13.32
7048	18.40	0.81	15.69
7049	14.31	0.96	12.50

*Moisture/Salt X Protein

The expected lot average M/S ratio for the combined data from all lots was calculated as 15.47 for NARADCOM samples and 14.97 for Fort Meade samples. A correlation (+0.50), which was significant ($p < 0.05$) was obtained for the M/S ratio and the samples containing reportable numbers of staphylococci.

Whiting, et al.⁸ suggested that an index calculated by dividing the percent moisture by the product of the percent salt times the percent protein (M/SXP) might be useful as a secondary measure of the shelf stability of precooked canned bacon. The proponents found that an M/SXP Index of 0.40 corresponded to a brine ratio (moisture divided by salt) of 9.0.

The M/SXP Index was calculated for each of the 221 samples of bacon analyzed at NARADCOM. The results are presented in Tables 18 through 34. Only 28 (12.7 percent) of the samples complied with the M/SXP Index of 0.40; 25 (11.3 percent) samples complied with both the M/S ratio and M/SXP Index; and 36 (16.3 percent) samples complied with the M/S ratio but did not comply with the M/SXP Index. The correlation between the M/S ratio and the M/SXP Index was 0.71 ($p < 0.01$). The correlation between the A_w and the M/SXP Index was 0.22 ($p < 0.05$). The expected lot average M/SXP Index for each lot of bacon is shown above. The expected lot average for all data was calculated to be 0.79.

Water Activity (A_w) has been explored as a possible microbiological control for canned precooked bacon. In-house studies have shown that the A_w is not a practical test for use in procurement at the present time, although there are indications that simple testing procedures may be available soon. No guidelines specific for the A_w of precooked bacon were found in the literature. The most commonly used A_w is 0.86. This is the A_w that was used as the criterion for the bacon. Only 21 (9.5 percent) of the samples were found to have an A_w of 0.86 or below. Only 71 (32.1 percent) of the samples were below an A_w of 0.9. The expected lot average A_w was calculated as 0.99 when all of the data was considered. The expected lot average A_w for individual lots of bacon ranged from 0.92 to 1.00. No significant correlation was found between reportable numbers of staphylococci and A_w .

When all of the data was considered, a positive correlation (0.24) significant at the two percent level was found between A_w and the moisture-to-salt ratio. The values for protein, fat, and ash show the variability of bacon. The protein level ranged from 8.95 to 25.20 percent, the fat from 26.07 to 65.80 percent and the ash from 3.04 to 5.71 percent. A negative correlation, significant at the one-percent level, was found for the protein and fat value.

The mean value and the range of values for the chemical analyses for moisture, salt, protein, fat, and ash (NARADCOM data) and for moisture, salt and fat (Ft. Meade data) are shown in Tables 52 and 63, respectively.

As a result of this study it was determined that the bacon could not be used for its intended purpose and that technically it was not feasible to reclaim it in any way for Armed Forces use.

⁸ C. S. Whiting, G. W. Evans, J. G. Cervený, and F. C. Olson. The effect of equilibrium relative humidity on shelf life of prefried canned bacon. Proceedings of the Sixteenth Research Conference, American Meat Institute Foundation pp. 35-42. (1964).

REFERENCES

- Association of Official Analytical Chemists. Official Methods of Analysis, 12th edition, Washington, DC, Association of Official Analytical Chemists. 1094 pp. (1975).
- American Public Health Association. The Compendium of Methods for Microbiological Examination of Foods. Marvin L. Speck, editor. Washington, DC American Public Health Association. 701 pp. (1976).
- Davies, O.L. editor. Statistical Methods in Research and Production, 3rd edition. New York. Hafner Publishing Company. 396 pp. (1961).
- Dixon, W.J. and F.J. Massey, Jr. Introduction to Statistical Analysis, 2nd edition. New York. McGraw Hill Book Company, Inc. 488 pp. (1957).
- Fisher, R.A. and F. Yates. Statistical Tables for Biological, Agricultural and Medical Research, 4th Edition, Edinburgh. Oliver and Boyd, Ltd. 126 pp. (1953).
- Greenspan, L. Humidity fixed points of binary saturated aqueous solutions. J. Res. (National Bureau of Standards) 81A: 89-96 (1977).
- Legris, G.J. From frying pan to ration can. Activities Report, third quarter; 203, 206-208 (1953). (Published by Research and Development Associates Food and Container Institute, Inc., now known as Research and Development Associates for Military Food and Packaging Systems, Inc., Room 1315, 90 Church Street, New York, NY 10007).
- Quartermaster Corps. Bacon, Prefried. Purchase Description. Unnumbered (1952).
- Quartermaster Corps. Bacon, Sliced, Canned, Prefried. Military Specification MIL-B-35032 (1958).
- Rockland, L.B. Saturated salt solutions for static control of relative humidity between 5° and 40°C. Anal. Chem. 32: 1375-1376. (1960).
- U.S. Department of Defense 1963. Military Standard. Sampling Procedures and Tables for Inspection by Attributes. MIL-STD-105D. (1963).
- U.S. Department of Health, Education, and Welfare; Food and Drug Administration Bacteriological Analytical Manual, 4th Edition. (1976).
- Whiting, C.S., G.W. Evans, J.G. Cervený, and F.C. Olson. The effect of equilibrium relative humidity on shelf life of prefried canned bacon. Proceedings of the Sixteenth Research Conference, Research Council of the American Meat Institute Foundation. pp. 35-42 (1964).

TABLE 1 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7024 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.1×10^5	<100	<100
2	<100	↓	↓
3	3.0×10^2		
4	1.0×10^2		
5	2.0×10^3		
6	3.5×10^2		
7	<100		
8	<100		
9	2.5×10^2		
10	8.1×10^3		
11	4.3×10^4		
12	1.7×10^5		
13	1.0×10^2		

TABLE 2 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7025 (NARADCOM Data)



Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	6.4×10^3	≤ 100	≤ 100
2	1.8×10^3		
3	4.6×10^4		
4	1.2×10^4		
5	3.6×10^4		
6	1.7×10^7		
7	2.6×10^3		
8	≤ 100		
9	6.0×10^2		
10	1.7×10^4		
11	4.0×10^2		
12	8.2×10^4		
13	6.2×10^4		

TABLE 3 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7026 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.6×10^3	<100	<100
2	<100	↓	↓
3	2.4×10^6		
4	3.1×10^5		
5	1.0×10^5		
6	<100		
7	↓		
8	↓		
9	4.7×10^3		
10	<100		
11	<100		
12	1.7×10^3		
13	1.1×10^3		

TABLE 4 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7027 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.3×10^3	<100	<100
2	2.2×10^3		
3	1.0×10^2		
4	7.0×10^3		
5	1.4×10^4		
6	8.7×10^4		9.5×10^3
7	2.7×10^6		<100
8	1.8×10^3		<100
9	1.7×10^3		2.0×10^2
10	2.0×10^2		<100
11	5.0×10^3		
12	2.7×10^3		
13	5.8×10^4		

TABLE 5 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7031 (NARADCOM Data)





Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.6×10^6	< 100	< 100
2	1.3×10^4		
3	7.1×10^3		
4	3.2×10^4		2.0×10^4
5	2.1×10^4		< 100
6	6.4×10^5		
7	6.7×10^3		
8	8.5×10^3		
9	2.0×10^4		
10	8.2×10^3		
11	1.3×10^3		
12	1.0×10^2		
13	< 100		

TABLE 6 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7033 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.4×10^5	< 100	< 100
2	5.7×10^3	↓	< 100
3	4.0×10^5		1.4×10^5
4	6.6×10^3		< 100
5	1.1×10^5		5.2×10^4
6	4.2×10^4		< 100
7	2.1×10^3		↓
8	7.4×10^3		
9	1.1×10^5		
10	5.6×10^3		
11	2.1×10^5		
12	2.6×10^6		1.7×10^5
13	5.3×10^3		< 100

TABLE 7 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7034 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	3.9×10^4	<100	<100
2	1.2×10^6		2.3×10^3
3	8.3×10^5		<100
4	7.0×10^2		
5	1.5×10^5		
6	3.5×10^4		
7	5.9×10^3		
8	3.0×10^3		
9	2.3×10^5		
10	1.3×10^7		
11	1.3×10^4		
12	6.0×10^2		
13	3.0×10^6		

TABLE 8 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7035 (NARADCOM Data)


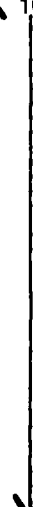
Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	2.2×10^5	< 100 	7.0×10^2
2	4.5×10^6		8.4×10^4
3	3.5×10^7		9.4×10^3
4	9.0×10^6		2.3×10^3
5	1.3×10^5		< 100 
6	6.9×10^4		
7	7.3×10^6		
8	6.8×10^4		
9	1.5×10^2		
10	1.3×10^4		
11	4.9×10^4		
12	2.9×10^3		
13	2.8×10^5		

TABLE 8 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7039 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.0×10^4	< 100	< 100
2	8.6×10^5	↓	↓
3	1.9×10^4		
4	1.0×10^6		
5	2.1×10^4		
6	5.3×10^4		
7	5.6×10^3		
8	2.7×10^3		
9	3.3×10^5		
10	2.6×10^6		1.7×10^4
11	2.5×10^6		< 100
12	1.5×10^5		↓
13	4.5×10^2	↓	

TABLE 10 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7040 (NARADCOM Data)



Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	7.0×10^2	< 100 	< 100 
2	4.2×10^3		
3	1.7×10^3		
4	1.5×10^3		
5	3.0×10^2		
6	5.0×10^2		
7	< 100		
8	1.6×10^3		
9	3.0×10^3		
10	3.1×10^4		
11	1.0×10^2		
12	8.6×10^4		
13	3.0×10^2		

TABLE 11- Results of the Microbiological Analysis of Samples
of Bacon from Lot 7041 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.4×10^6	< 100	< 100
2	5.8×10^5	↓	↓
3	7.0×10^5		
4	2.5×10^2		
5	8.9×10^4		↓
6	4.0×10^5		4.0×10^2
7	7.0×10^5		2.7×10^3
8	7.0×10^2		< 100
9	2.3×10^3		↓
10	5.6×10^4		
11	9.6×10^5		
12	2.0×10^2		
13	2.0×10^4		↓

TABLE 12- Results of the Microbiological Analysis of Samples
of Bacon from Lot 7042 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	3.4×10^3	<100	<100
2	6.3×10^4	↓	↓
3	6.0×10^4		
4	1.6×10^6		
5	5.0×10^2		
6	8.0×10^2		
7	3.0×10^5		
8	6.0×10^2		
9	5.1×10^3		
10	1.6×10^6		
11	6.0×10^2		
12	1.7×10^4		
13	1.5×10^4		

TABLE 13 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7045 (NARADCOM Data)



Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	7.6×10^3	≤ 100	≤ 100
2	≤ 100		
3	2.7×10^3		
4	1.3×10^5		
5	8.5×10^4		
6	3.1×10^4		
7	8.9×10^4		
8	6.1×10^5		
9	1.1×10^6		
10	3.4×10^5		7.1×10^2
11	7.5×10^4		≤ 100
12	1.0×10^6		2.5×10^4
13	2.0×10^2		≤ 100

TABLE 14 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7046 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	2.6×10^4	<100	<100
2	1.9×10^3		
3	8.8×10^3		
4	6.1×10^3		
5	2.4×10^4		
6	5.8×10^3		
7	1.9×10^4		
8	2.6×10^3		
9	1.4×10^4		
10	5.5×10^2		
11	1.4×10^4		
12	1.8×10^4		
13	2.6×10^4		

TABLE 15 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7047 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	1.1×10^3	≤ 100	≤ 100
2	5.0×10^2	↓	↓
3	5.0×10^4		
4	1.0×10^4		
5	5.5×10^2		
6	1.2×10^4		
7	9.5×10^4		
8	5.5×10^3		
9	2.9×10^4		
10	4.0×10^2		
11	7.0×10^2		
12	3.0×10^4		≤ 100
13	≤ 100	↓	≤ 100

TABLE 16 - Results of the Microbiological Analysis of Samples
of Bacon from Lot 7048 (NARADCOM Data)


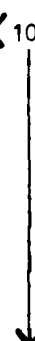

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	5.4×10^3	≤ 100	≤ 100
2	2.0×10^3		
3	7.3×10^6		
4	1.9×10^4		
5	3.0×10^2		
6	2.1×10^3		
7	3.2×10^4		1.0×10^5
8	8.0×10^2		≤ 100
9	3.1×10^3		
10	7.3×10^3		
11	2.8×10^5		
12	2.3×10^3		
13	1.6×10^6		

TABLE 17- Results of the Microbiological Analysis of Samples
of Bacon from Lot 7049 (NARADCOM Data)

Can Number	Aerobic Plate Count/g	Yeast and Mold/g	Coagulase Positive Staphylococci/g
1	2.7×10^6	≤ 100	5.0×10^2
2	1.3×10^6	↓	≤ 100
3	1.5×10^4		↓
4	1.5×10^2		
5	1.5×10^2		↓
6	4.7×10^4		1.9×10^4
7	1.6×10^3		≤ 100
8	7.8×10^3		↓
9	6.0×10^2		
10	7.1×10^3		
11	≤ 100		
12	1.5×10^2		
13	2.6×10^4	↓	↓

TABLE 18 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7024 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A_w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot
1	30.7	2.6	21.4	43.0	3.9	0.87	30.4	11.8	0.55
2	31.6	2.8	23.2	39.8	4.2	0.86	27.0	11.3	0.48
3	34.7	2.9	20.0	40.4	4.0	0.88	33.8	12.0	0.60
4	30.8	2.9	23.8	40.1	4.3	0.92	27.0	10.6	0.45
5	31.1	2.8	19.2	44.5	4.0	0.92	27.0	11.1	0.58
6	29.2	3.0	17.2	48.6	4.3	0.93	40.5	9.7	0.57
7	30.2	2.7	20.4	45.0	3.9	0.93	30.4	11.2	0.55
8	32.9	2.8	20.1	41.8	4.0	0.96	23.6	11.8	0.58
9	30.2	2.8	17.6	47.2	4.0	0.95	27.0	10.8	0.61
10	28.3	2.6	17.2	50.3	3.7	0.91	33.8	10.9	0.63
11	30.6	2.9	19.8	44.4	4.2	0.90	33.8	10.5	0.53
12	33.3	2.3	20.5	42.6	3.5	0.94	30.4	14.5	0.71
13	32.0	3.1	20.2	42.3	4.4	0.92	27.0	10.3	0.51

TABLE 19 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7025 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	30.4	2.4	22.5	42.7	3.4	0.90	23.6	12.7	0.56
2	29.3	2.8	21.2	44.5	4.0	0.91	27.0	10.5	0.49
3	34.2	2.4	20.8	40.3	3.7	0.89	33.8	14.2	0.68
4	28.0	3.2	20.1	46.5	4.3	0.86	30.4	8.8	0.43
5	31.8	2.6	21.5	41.7	3.8	0.92	27.0	12.2	0.57
6	38.2	2.5	22.8	34.5	3.7	0.89	43.9	15.3	0.67
7	33.1	2.7	19.4	42.4	3.9	0.87	30.4	12.3	0.63
8	31.3	2.4	20.4	43.7	3.6	0.91	27.0	13.0	0.64
9	34.3	2.7	21.9	39.0	3.8	0.87	23.6	12.7	0.58
10	31.1	2.4	21.8	43.0	3.5	0.92	27.0	13.0	0.59
11	32.1	3.1	20.1	42.4	4.3	0.94	33.8	10.3	0.51
12	37.1	2.8	18.9	39.0	3.8	0.92	40.5	13.2	0.70
13	34.3	2.9	23.0	37.7	4.0	0.95	30.4	11.8	0.51

TABLE 20 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7026 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot
1	32.1	3.6	20.4	41.7	4.8	0.90	30.4	8.9	0.44
2	28.5	3.8	16.2	49.4	4.9	0.88	27.0	7.5	0.46
3	32.5	3.6	19.6	42.0	4.7	0.89	40.5	9.0	0.46
4	30.2	3.5	19.6	44.4	4.6	0.89	27.0	8.6	0.44
5	34.8	3.1	22.8	36.9	4.2	0.89	30.4	11.2	0.49
6	27.7	3.5	17.1	50.4	4.5	0.90	27.0	7.9	0.46
7	35.0	3.6	17.5	41.8	4.6	0.89	37.1	9.7	0.55
8	28.4	3.7	19.9	46.0	4.8	0.90	23.6	7.7	0.38
9	32.4	3.7	19.9	42.3	4.7	0.89	33.8	8.8	0.44
10	32.9	3.5	21.8	40.0	4.5	0.89	27.0	9.4	0.43
11	29.4	3.6	23.3	42.8	4.7	0.88	27.0	8.1	0.35
12	33.5	3.5	21.6	39.5	4.6	0.92	43.9	9.6	0.44
13	29.0	3.2	16.5	49.2	4.1	0.88	33.8	9.1	0.55

TABLE 21 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7027 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot
1	32.8	3.5	18.2	43.5	4.7	0.90	33.8	9.4	0.51
2	25.6	3.2	19.1	50.2	4.3	0.90	30.4	8.0	0.42
3	32.5	3.4	19.3	42.8	4.6	0.89	43.9	9.6	0.49
4	32.0	3.5	22.6	39.6	4.7	0.90	33.8	9.1	0.40
5	30.9	2.6	24.7	40.0	3.7	0.89	33.8	11.9	0.48
6	34.4	2.6	22.5	38.6	3.7	0.94	40.5	13.2	0.59
7	33.6	2.5	17.2	44.5	3.4	0.89	37.1	13.4	0.78
8	31.6	3.2	23.4	39.6	4.4	0.86	33.8	9.9	0.42
9	35.3	2.9	19.9	39.7	4.0	0.86	37.1	12.5	0.61
10	32.0	3.5	17.2	45.5	4.6	0.88	27.0	9.1	0.53
11	28.8	3.2	18.3	47.5	4.5	0.89	33.8	9.0	0.49
12	30.3	3.5	21.5	42.3	4.8	0.89	40.5	8.6	0.40
13	37.6	2.7	22.9	35.0	4.0	0.86	40.5	13.9	0.61

TABLE 22 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7031 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	34.8	3.3	22.8	37.7	4.3	0.96	27.0	10.5	0.46
2	31.1	3.0	21.6	42.6	4.0	0.95	40.5	10.4	0.48
3	35.7	3.1	21.0	38.5	4.2	0.95	27.0	11.5	0.55
4	34.2	3.2	23.0	37.3	4.2	0.95	27.0	10.7	0.46
5	33.3	3.2	20.7	41.6	4.2	0.95	30.4	10.4	0.50
6	36.1	3.2	19.8	40.5	4.1	0.95	40.5	11.3	0.57
7	30.9	3.2	18.4	46.5	4.1	0.94	27.0	9.6	0.52
8	31.2	3.6	19.3	44.6	4.6	0.94	30.4	8.7	0.45
9	32.3	3.6	23.0	39.7	4.6	0.94	40.5	9.0	0.39
10	34.2	3.6	20.4	39.7	4.6	0.95	30.4	9.5	0.46
11	32.3	3.9	20.7	41.1	4.9	0.94	27.0	8.3	0.40
12	33.0	4.0	21.4	40.4	5.0	0.92	27.0	8.2	0.38
13	30.1	3.6	17.8	47.1	4.5	0.92	27.0	8.4	0.47

TABLE 23 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7033 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	27.6	3.0	14.0	54.8	3.7	0.94	40.5	9.2	0.66
2	28.5	2.9	19.0	48.2	4.0	0.94	33.8	9.8	0.52
3	33.7	2.7	19.2	42.7	3.8	0.95	40.5	12.5	0.65
4	32.6	2.9	19.7	43.4	4.1	0.96	30.4	11.2	0.57
5	28.4	2.6	17.6	50.1	3.6	0.90	33.8	10.9	0.62
6	34.3	2.2	19.8	43.3	3.2	0.97	33.8	15.6	0.78
7	31.5	2.3	23.3	40.9	3.5	0.93	30.4	13.7	0.59
8	32.4	2.7	22.9	41.3	3.7	0.95	37.1	12.0	0.52
9	32.4	2.7	22.9	40.8	3.9	0.93	37.1	12.0	0.52
10	34.6	3.3	20.5	40.1	4.3	0.93	33.8	10.5	0.51
11	37.1	2.5	21.9	37.7	3.5	0.96	40.5	14.8	0.68
12	45.9	2.1	25.2	26.1	3.3	0.96	70.9	21.9	0.87
13	30.2	3.1	18.8	47.2	4.2	0.92	27.0	9.7	0.52

TABLE 24 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7034 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	28.3	2.7	21.4	45.9	3.6	0.94	30.4	10.5	0.49
2	43.2	2.4	21.2	30.9	3.6	0.96	50.6	18.0	0.85
3	37.2	2.7	18.7	40.4	3.5	0.94	54.0	13.8	0.74
4	33.4	3.0	19.9	42.9	4.0	0.95	30.4	11.1	0.56
5	37.8	3.0	21.5	37.1	3.9	0.96	37.1	12.6	0.59
6	37.4	3.0	19.1	40.0	3.9	0.96	47.3	12.5	0.65
7	33.6	3.0	20.3	42.3	3.8	0.94	33.8	11.2	0.55
8	37.0	3.1	18.3	40.8	3.9	0.96	33.8	11.9	0.65
9	27.0	2.7	15.2	53.7	3.6	0.93	33.8	10.0	0.66
10	34.4	3.0	20.1	41.3	3.8	0.93	37.1	11.5	0.57
11	32.6	3.3	19.5	42.8	4.2	0.94	33.8	9.9	0.51
12	27.6	3.3	15.0	52.5	4.0	0.93	27.0	8.4	0.56
13	40.8	2.2	23.2	33.1	3.0	0.91	50.6	18.5	0.80

TABLE 25 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7035 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A_w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot
1	27.7	3.2	17.8	49.4	4.2	0.92	27.4	8.7	0.49
2	29.8	3.1	16.0	50.0	4.1	0.89	34.2	9.6	0.60
3	33.8	3.1	18.9	42.9	4.1	0.89	27.4	10.9	0.58
4	35.9	2.8	16.9	42.8	3.7	0.95	27.4	12.8	0.76
5	31.4	3.6	21.3	41.8	4.5	0.91	33.8	8.7	0.41
6	30.4	3.0	17.2	47.2	3.8	0.93	30.4	10.7	0.59
7	38.6	2.8	17.6	39.3	3.7	0.94	30.4	13.8	0.78
8	29.5	2.9	14.8	51.6	3.7	0.92	30.4	10.2	0.69
9	28.0	3.8	19.5	47.3	4.9	0.92	30.4	7.4	0.38
10	36.8	3.3	23.5	34.5	4.5	0.93	34.2	11.1	0.47
11	29.9	3.0	19.2	46.7	4.0	0.91	33.8	10.0	0.52
12	31.9	3.7	21.8	40.2	4.9	0.90	33.8	8.6	0.39
13	32.9	3.0	15.7	46.6	4.1	0.92	30.4	11.0	0.69

TABLE 26 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7039 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	30.3	3.0	19.4	45.6	3.9	0.90	23.6	10.1	0.52
2	34.4	3.1	19.5	41.0	4.0	0.94	33.8	11.1	0.57
3	29.8	3.0	21.1	44.0	4.0	0.89	30.4	9.9	0.46
4	34.8	3.0	21.3	40.0	4.1	0.92	37.1	11.6	0.54
5	29.2	3.2	14.5	52.2	4.2	0.90	33.8	9.1	0.63
6	37.6	3.7	21.1	36.1	4.8	0.92	27.0	10.2	0.48
7	32.4	3.6	18.7	43.4	4.7	0.90	27.0	9.0	0.48
8	40.1	3.8	22.1	31.7	4.9	0.90	27.0	10.6	0.48
9	35.1	3.3	20.0	39.7	4.2	0.92	33.8	10.6	0.53
10	34.2	3.4	19.1	41.4	4.5	0.88	34.6	10.0	0.53
11	36.2	3.4	17.2	40.8	4.7	0.89	40.5	10.6	0.62
12	33.5	3.1	19.3	42.7	4.2	0.91	40.5	10.8	0.56
13	35.1	3.4	15.9	44.0	4.6	0.91	30.4	10.3	0.65

TABLE 27 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7040 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	33.2	3.6	17.0	44.1	4.6	0.94	30.4	9.2	0.54
2	30.0	3.2	16.8	48.0	4.1	0.94	27.0	9.4	0.56
3	30.6	3.5	17.5	46.1	4.6	0.94	40.5	8.7	0.50
4	24.5	3.8	16.6	53.0	4.7	0.90	23.6	6.4	0.39
5	32.5	3.9	21.4	40.6	4.9	0.93	27.0	8.3	0.39
6	30.6	3.7	17.2	47.3	4.7	0.91	27.0	8.3	0.48
7	30.4	3.9	17.0	47.0	4.8	0.91	40.5	7.8	0.46
8	33.1	3.8	19.2	43.5	4.7	0.93	30.4	8.7	0.45
9	37.7	3.9	19.6	36.7	5.0	0.94	27.0	9.7	0.49
10	35.6	3.4	19.3	40.8	4.3	0.95	27.0	10.5	0.53
11	30.0	4.1	18.0	46.6	5.0	0.92	43.9	7.3	0.41
12	37.0	3.8	18.2	39.1	5.0	0.93	33.8	9.7	0.53
13	34.9	3.3	20.6	38.8	4.4	0.94	30.4	10.6	0.51

TABLE 28 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7041 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot
1	32.6	3.2	14.2	48.4	4.3	0.87	30.4	10.2	0.72
2	39.3	3.6	20.3	35.0	4.7	0.87	40.5	10.9	0.54
3	30.8	3.2	18.1	45.6	4.2	0.89	40.5	9.6	0.53
4	28.7	4.3	19.6	45.2	5.4	0.86	23.6	6.7	0.34
5	36.0	2.8	19.3	40.4	3.7	0.95	37.1	12.8	0.67
6	30.8	2.8	15.9	48.4	3.7	0.90	37.1	11.0	0.69
7	31.4	3.1	20.4	42.7	4.2	0.91	40.5	10.1	0.50
8	31.6	4.2	22.5	39.5	5.4	0.85	27.0	7.5	0.33
9	30.1	3.3	21.9	42.5	4.3	0.87	33.8	9.1	0.42
10	29.4	3.2	16.7	49.0	4.3	0.89	27.0	9.2	0.55
11	34.6	2.7	16.7	44.7	3.8	0.88	40.5	12.8	0.77
12	37.6	3.5	15.7	41.0	4.6	0.90	27.0	10.7	0.68
13	33.6	3.4	25.3	35.9	4.6	0.89	23.6	9.9	0.39

TABLE 29 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7042 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	29.7	4.3	19.7	44.3	5.3	0.89	27.0	6.9	0.35
2	31.5	3.1	18.6	41.5	4.1	0.93	30.4	10.2	0.55
3	33.8	3.4	22.4	38.2	4.5	0.90	27.0	9.9	0.44
4	35.7	3.8	17.5	41.8	5.0	0.90	30.4	9.4	0.54
5	31.6	3.4	19.8	43.7	4.5	0.88	27.0	9.3	0.47
6	25.6	3.8	13.3	56.6	4.7	0.88	37.1	6.7	0.51
7	37.2	3.6	23.5	34.6	4.7	0.92	23.6	10.3	0.44
8	31.9	3.8	18.9	43.0	5.0	0.92	27.0	8.4	0.44
9	32.4	3.2	19.0	43.9	4.5	0.89	33.8	10.1	0.53
10	36.4	3.0	19.5	39.3	4.1	0.94	33.8	12.1	0.62
11	25.6	3.4	15.3	54.7	4.4	0.88	30.4	7.5	0.49
12	35.0	3.4	19.1	40.4	4.5	0.91	23.6	10.2	0.54
13	29.9	3.5	19.0	45.9	4.7	0.89	27.0	8.5	0.45

TABLE 30 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7045 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot
1	28.4	3.3	20.1	46.9	4.2	0.94	27.0	8.6	0.43
2	36.0	3.5	17.5	40.9	4.6	0.92	33.8	10.3	0.59
3	27.0	3.3	15.3	53.3	4.1	0.93	37.1	8.2	0.53
4	32.2	2.8	20.6	42.4	3.7	0.95	37.1	11.5	0.56
5	36.9	2.7	22.7	35.4	3.8	0.96	30.4	13.7	0.60
6	28.3	2.6	18.0	49.1	3.5	0.95	33.8	10.9	0.60
7	35.8	3.6	18.9	40.3	4.6	0.95	33.8	9.9	0.53
8	39.7	2.8	22.1	33.8	3.8	0.97	50.6	14.2	0.64
9	35.0	2.8	21.1	39.6	3.8	0.95	37.1	12.5	0.59
10	34.0	3.1	16.9	44.5	4.0	0.93	40.5	11.0	0.65
11	34.2	3.1	18.3	42.3	4.1	0.94	33.8	11.0	0.60
12	31.1	2.8	14.3	51.3	3.6	0.95	47.3	11.1	0.78
13	32.2	3.1	17.2	47.2	4.0	0.96	27.0	10.4	0.60

TABLE 31 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7046 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	31.2	3.6	21.6	41.9	4.7	0.94	33.8	8.7	0.40
2	27.6	3.1	23.4	44.3	4.2	0.90	33.8	8.9	0.38
3	27.8	3.4	15.2	51.8	4.2	0.92	37.1	8.2	0.54
4	28.3	4.6	22.2	43.0	5.7	0.90	33.8	6.1	0.28
5	28.5	3.2	15.9	51.6	3.9	0.97	27.0	8.9	0.56
6	30.4	3.5	22.1	42.2	4.6	0.94	27.0	8.7	0.39
7	29.6	3.5	17.8	47.3	4.4	0.94	33.8	8.5	0.47
8	28.7	4.4	19.1	46.4	5.4	0.82	50.6	6.5	0.34
9	28.7	2.9	16.7	50.2	3.6	0.83	37.1	9.9	0.59
10	32.0	3.9	23.3	38.5	5.0	0.92	30.4	8.2	0.35
11	27.4	3.0	20.2	47.6	3.9	0.94	27.0	9.1	0.45
12	27.2	3.6	19.8	47.7	4.5	0.92	30.4	7.6	0.38
13	39.8	3.6	19.2	36.5	4.5	0.96	33.8	11.1	0.58

TABLE 32 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7047 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	30.3	4.2	19.0	44.3	5.2	0.87	27.0	7.2	0.38
2	34.4	3.8	17.8	41.8	4.9	0.93	33.8	9.0	0.51
3	36.2	3.6	21.3	37.7	4.7	0.90	43.9	10.0	0.47
4	31.4	3.5	19.2	43.8	4.4	0.89	30.4	9.0	0.48
5	25.3	4.2	14.9	53.8	5.0	0.88	27.0	6.0	0.40
6	32.7	3.3	19.3	42.8	4.2	0.91	27.0	9.9	0.51
7	34.3	3.0	19.5	41.3	4.1	0.91	47.3	11.4	0.59
8	35.1	3.3	16.9	43.3	4.2	0.92	30.4	10.6	0.63
9	31.9	3.4	20.4	42.5	4.4	0.89	27.0	9.4	0.46
10	31.0	3.7	18.7	45.0	4.8	0.92	27.0	8.4	0.45
11	28.9	4.4	21.2	43.1	5.5	0.90	37.1	6.6	0.31
12	29.8	3.1	21.0	44.2	4.2	0.96	43.9	9.6	0.46
13	25.7	4.3	19.3	48.4	5.3	0.92	47.3	6.0	0.31

TABLE 33 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7048 (NARADCOM Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (kPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot.
1	28.3	3.9	15.5	50.1	4.9	0.96	33.8	7.3	0.49
2	31.1	3.5	18.3	44.9	4.4	0.85	40.5	8.9	0.48
3	44.9	2.8	22.3	29.6	3.9	0.86	77.8	16.0	0.72
4	33.6	2.9	25.2	36.1	4.0	0.86	33.8	11.6	0.46
5	27.8	3.7	18.6	48.4	4.8	0.81	27.0	7.5	0.40
6	27.1	3.6	17.1	50.4	4.6	0.84	33.8	7.5	0.44
7	35.1	2.4	20.6	39.9	3.3	0.87	37.1	14.6	0.71
8	35.4	3.2	23.6	36.0	4.3	0.85	27.0	11.1	0.47
9	34.2	3.3	16.7	43.9	4.2	0.86	37.1	10.5	0.62
10	33.3	4.0	18.8	41.8	5.0	0.86	37.1	8.3	0.44
11	34.8	3.3	17.4	42.4	4.3	0.85	33.8	10.5	0.61
12	31.2	3.4	18.6	44.6	4.6	0.86	33.8	9.2	0.49
13	37.7	2.5	23.6	34.5	3.7	0.88	33.8	15.1	0.64

TABLE 34 - Results of the Chemical and Physical Analysis
of Samples of Bacon from Lot 7049 (NAPAC M Data)

Can Number	% Water	% Salt	% Protein	% Fat	% Ash	A _w	Pressure (KPa)	Moisture- to-Salt Ratio	Moisture ÷ Salt x Prot
1	34.5	2.3	19.0	42.8	3.3	0.93	43.3	15.0	0.81
2	28.5	3.1	13.4	54.0	4.0	0.89	50.6	9.2	0.69
3	33.0	3.4	16.8	44.3	4.5	0.89	40.5	9.7	0.58
4	34.1	4.4	19.3	39.6	5.7	0.86	33.8	7.7	0.40
5	30.0	3.2	18.9	45.6	4.4	0.86	27.0	9.4	0.50
6	32.3	3.1	13.8	48.5	4.1	0.90	37.1	10.4	0.76
7	31.7	3.2	19.9	43.5	4.3	0.84	33.8	9.9	0.50
8	30.7	3.2	20.7	43.3	4.3	0.89	33.8	9.5	0.46
9	29.9	3.3	15.8	48.7	4.3	0.89	33.8	9.1	0.57
10	32.9	3.3	16.1	45.5	4.3	0.90	37.1	10.0	0.62
11	20.6	2.7	9.0	65.8	3.4	0.90	30.4	7.6	0.85
12	32.2	3.5	14.6	47.5	4.6	0.89	37.1	9.2	0.63
13	32.6	3.4	17.0	44.9	4.5	0.91	43.9	9.6	0.56

TABLE 35 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7024 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	30.6	2.6	43.2	11.8
2	30.5	2.6	47.1	11.8
3	28.6	2.6	41.8	11.0
4	28.5	3.5	43.9	8.1
5	32.5	2.8	43.0	11.6
6	29.4	3.0	41.2	9.8
7	32.6	3.0	40.9	10.9
8	32.2	2.4	44.1	13.4
9	29.6	3.2	42.5	9.2
10	29.3	3.1	45.7	9.4
11	34.0	3.2	38.4	10.6
12	25.3	3.1	51.9	8.2
13	35.0	2.7	38.8	13.0

TABLE 36 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7025 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	29.4	2.9	45.4	10.1
2	31.5	2.4	42.6	13.1
3	36.2	2.1	40.4	17.2
4	33.1	2.6	42.4	12.7
5	31.5	2.5	44.5	12.6
6	31.2	3.3	47.3	9.4
7	34.5	2.7	39.1	12.8
8	35.3	2.9	36.1	12.2
9	28.4	2.6	50.4	10.9
10	32.8	2.8	40.0	11.7
11	30.9	2.8	44.4	11.0
12	30.3	3.2	44.9	9.5
13	32.6	2.9	40.5	11.2

TABLE 37 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7026 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	29.5	3.8	46.7	7.8
2	32.2	3.2	42.7	10.1
3	33.4	3.3	39.0	10.1
4	33.6	3.7	41.9	9.1
5	28.7	3.5	46.8	8.2
6	29.6	3.4	50.9	8.7
7	32.2	3.3	44.5	9.8
8	29.7	2.2	48.4	13.5
9	27.1	3.4	48.6	8.0
10	32.1	3.1	41.6	10.3
11	34.1	2.8	39.4	12.2
12	27.8	3.4	46.6	8.2
13	28.8	3.2	45.3	9.0

TABLE 38- Results of the Chemical Analysis of Samples
of Bacon from Lot 7027 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	32.6	3.8	44.5	8.6
2	36.2	3.1	38.4	11.7
3	32.4	3.7	40.0	8.8
4	28.7	3.8	44.2	7.6
5	37.2	2.6	33.2	14.3
6	30.8	3.6	43.7	8.6
7	25.2	3.4	53.4	7.4
8	32.1	3.7	43.6	8.7
9	32.1	3.7	40.6	8.7
10	35.1	2.8	39.2	12.5
11	35.5	2.9	31.8	12.2
12	29.7	3.2	44.2	9.3
13	31.0	3.2	44.4	9.8

TABLE 39 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7031 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	34.4	3.6	39.4	9.6
2	30.3	3.1	47.0	9.8
3	33.6	3.3	40.3	10.2
4	31.5	5.1	41.3	6.2
5	31.2	3.7	40.3	8.4
6	25.9	3.6	51.2	7.2
7	31.3	5.6	43.5	5.6
8	35.8	2.9	34.6	12.3
9	29.9	4.0	43.6	7.5
10	30.6	3.4	42.6	9.0
11	28.2	3.6	49.5	7.8
12	30.8	3.4	44.1	9.1
13	33.4	3.1	37.7	10.8

TABLE 40 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7033 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	31.4	3.0	42.3	10.5
2	33.1	2.7	41.1	12.3
3	32.2	3.1	41.8	10.4
4	30.5	2.9	44.7	10.5
5	27.5	3.1	45.6	8.9
6	31.5	3.0	44.5	10.5
7	29.7	3.3	46.0	9.0
8	28.9	3.2	43.2	9.0
9	30.9	2.4	40.8	12.9
10	31.6	2.4	44.2	13.2
11	25.6	2.9	52.2	8.8
12	29.7	2.7	47.7	11.0
13	35.2	3.0	38.5	11.7

TABLE 41 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7034 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	34.7	2.3	39.3	15.1
2	30.2	3.0	47.7	10.1
3	35.4	2.6	41.6	13.6
4	31.5	3.0	47.6	10.5
5	34.0	2.6	47.2	13.1
6	28.9	2.4	49.8	12.0
7	37.6	2.4	36.0	15.6
8	29.8	2.5	50.6	12.4
9	29.6	2.5	51.0	11.8
10	30.2	2.3	49.8	13.1
11	34.9	2.4	44.3	14.5
12	33.4	2.1	45.6	15.9
13	38.6	2.4	37.8	16.1

TABLE 42- Results of the Chemical Analysis of Samples
of Bacon from Lot 7035 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	40.4	3.4	29.6	11.9
2	32.1	3.1	47.4	10.3
3	32.4	2.9	44.0	11.2
4	30.0	3.7	44.7	8.1
5	34.1	3.2	40.4	10.7
6	30.6	3.2	46.1	9.6
7	30.0	3.4	45.6	8.8
8	29.6	3.0	48.4	9.9
9	38.7	2.9	35.7	13.3
10	37.8	2.9	38.8	13.0
11	37.9	3.2	40.3	11.8
12	31.1	2.4	49.7	13.0
13	34.4	2.5	41.1	13.8

TABLE 43 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7039 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	34.5	3.6	41.3	9.6
2	31.8	3.7	44.7	8.6
3	31.8	3.1	44.2	10.3
4	32.6	2.8	42.0	11.6
5	27.5	2.3	52.3	12.0
6	37.5	3.0	38.7	12.5
7	38.5	2.9	37.3	13.3
8	30.3	2.7	46.2	11.2
9	37.6	3.2	36.3	11.8
10	32.4	3.0	41.4	10.8
11	29.4	3.2	48.0	9.2
12	29.0	3.5	49.0	8.3
13	34.7	3.6	41.4	9.6

TABLE 44 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7040 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	33.6	3.3	42.8	10.2
2	29.7	4.0	48.9	7.4
3	40.9	2.8	24.3	14.6
4	31.7	3.3	43.8	9.6
5	34.1	3.4	43.2	10.0
6	32.2	3.5	44.8	9.2
7	31.3	3.1	45.5	10.1
8	31.6	3.8	44.7	8.3
9	33.1	3.4	42.3	9.7
10	32.9	3.2	41.1	10.3
11	32.4	4.0	40.1	8.1
12	29.7	3.4	45.2	8.7
13	29.8	3.3	49.0	9.0

TABLE 45 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7041 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	29.3	3.5	41.8	8.4
2	34.2	3.4	36.5	10.1
3	29.3	3.0	50.1	9.8
4	26.6	3.4	49.1	7.8
5	31.2	3.5	45.3	8.9
6	26.4	3.2	48.3	8.2
7	33.2	3.1	42.7	10.7
8	35.6	3.6	42.3	9.9
9	30.8	3.9	41.2	7.9
10	32.4	3.3	40.6	9.8
11	31.5	3.3	47.7	9.5
12	30.0	3.2	45.4	9.4
13	37.6	2.7	38.9	13.9

TABLE 46 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7042 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	32.4	3.3	46.6	9.8
2	29.4	3.5	47.8	8.4
3	31.8	3.7	46.0	8.6
4	31.2	3.5	46.4	8.9
5	31.5	3.8	44.2	8.3
6	33.1	3.2	47.1	10.3
7	35.4	3.2	38.3	11.1
8	32.6	3.2	38.1	10.2
9	31.1	3.6	49.0	8.6
10	29.5	3.3	48.2	8.9
11	29.8	3.3	50.1	9.0
12	32.9	3.7	41.8	8.9
13	32.2	3.3	44.5	9.8

TABLE 47 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7045 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	24.8	3.0	58.9	8.3
2	38.0	3.3	37.5	11.5
3	32.9	3.4	41.0	9.7
4	28.7	2.9	52.5	9.9
5	34.5	3.3	39.7	10.4
6	36.0	3.5	40.7	10.3
7	33.6	2.9	40.8	11.6
8	34.9	2.9	42.3	12.0
9	29.6	3.0	49.6	9.9
10	36.8	3.5	37.8	10.5
11	31.0	2.9	46.4	10.7
12	31.2	3.0	44.2	10.4
13	36.2	3.5	44.2	10.3

TABLE 48 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7046 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	34.4	2.6	41.1	13.2
2	31.2	2.7	50.5	11.6
3	29.8	3.9	47.7	7.6
4	40.8	3.0	38.1	13.6
5	29.9	4.0	44.9	7.5
6	32.2	3.0	40.9	10.7
7	30.9	2.5	50.6	12.4
8	29.5	4.0	47.2	7.4
9	34.0	2.6	38.1	13.1
10	27.8	2.8	55.3	9.9
11	31.5	3.3	47.4	9.5
12	30.4	3.3	47.2	9.2
13	38.3	2.6	36.6	14.7

TABLE 49 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7047 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	32.8	2.7	41.6	12.1
2	31.1	3.5	44.4	8.9
3	33.9	4.0	37.6	8.5
4	33.3	4.2	42.2	7.9
5	28.4	2.7	51.7	10.5
6	29.9	3.2	33.2	9.3
7	31.8	3.9	39.8	8.1
8	32.4	3.4	41.3	9.5
9	30.9	2.8	41.9	11.0
10	27.5	3.3	50.3	8.3
11	35.6	3.7	39.5	9.6
12	34.1	3.2	38.0	10.6
13	28.7	2.5	51.2	11.5

TABLE 50 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7048 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	30.9	3.5	46.6	8.8
2	32.5	3.1	44.9	10.5
3	44.2	3.2	32.6	13.8
4	37.6	3.3	38.2	11.4
5	33.9	3.1	44.5	10.9
6	30.8	2.8	44.5	11.0
7	35.8	3.2	39.0	11.2
8	35.9	3.5	40.8	10.2
9	22.9	3.8	55.4	6.0
10	29.3	3.2	48.4	9.1
11	29.8	3.0	52.4	9.9
12	34.6	2.7	39.3	12.8
13	36.4	3.2	43.6	11.4

TABLE 51 - Results of the Chemical Analysis of Samples
of Bacon from Lot 7049 (Ft. Meade Data)

Can Number	% Moisture	% Salt	% Fat	Moisture- To-Salt Ratio
1	36.1	3.3	41.9	10.9
2	38.7	3.5	37.0	11.1
3	37.5	3.2	45.4	9.8
4	35.8	3.3	41.6	10.8
5	32.2	3.3	48.8	9.8
6	34.2	3.5	38.6	9.8
7	33.3	3.3	45.8	10.1
8	31.7	3.1	47.0	10.2
9	31.6	3.6	46.0	8.8
10	37.4	3.1	39.9	12.1
11	34.1	3.3	39.8	10.3
12	29.3	3.0	46.7	9.8
13	27.9	3.0	51.4	9.3

Table 52 The Mean and Range of Values of the Chemical Analyses of
Bacon as Obtained by NARADCOM'S Analytical Chemistry Laboratory

Lot Number	Mean (M) and Range (R)	H ₂ O	Salt	Protein	Fat	Ash
7024	M	31.20	2.78	20.05	43.84	4.02
	R	28.34 - 34.66	2.27 - 3.08	17.20 - 23.79	40.11 - 50.30	3.48 - 4.39
7025	M	32.72	2.68	21.11	41.34	3.83
	R	28.04 - 38.16	2.37 - 3.21	18.87 - 23.01	34.55 - 46.46	3.44 - 4.30
7026	M	31.27	3.53	19.71	43.57	4.59
	R	27.72 - 35.00	3.10 - 3.83	16.21 - 23.32	36.93 - 50.44	4.14 - 4.86
7027	M	32.12	3.11	20.54	42.21	4.26
	R	25.65 - 37.57	2.50 - 3.52	17.24 - 23.44	34.98 - 50.18	3.44 - 4.83
7031	M	33.01	3.40	20.77	41.35	4.41
	R	30.07 - 36.11	2.95 - 3.96	17.84 - 23.05	37.30 - 47.14	4.01 - 5.02
7033	M	33.02	2.69	20.38	42.81	3.75
	R	27.58 - 45.88	2.14 - 3.29	14.05 - 25.20	26.07 - 54.76	3.20 - 4.34
7034	M	34.64	2.88	19.47	41.88	3.75
	R	26.89 - 43.24	2.19 - 3.35	14.96 - 23.16	30.94 - 53.67	3.04 - 4.17
7035	M	32.04	3.18	18.48	44.72	4.17
	R	27.66 - 38.61	2.83 - 3.84	14.78 - 23.51	34.47 - 51.56	3.66 - 4.94
7039	M	34.06	3.29	19.18	41.73	4.36
	R	29.22 - 40.13	2.95 - 3.79	14.51 - 22.08	31.70 - 52.25	3.93 - 4.92

Table 52 (Continued)

Lot Number	Mean (M) and Range (R)	H ₂ O	Salt	Protein	Fat	Ash
7040	M	32.31	3.68	18.35	43.95	4.68
	R	24.52 - 37.71	3.16 - 4.07	16.64 - 21.44	36.71 - 52.95	4.07 - 5.04
7041	M	33.50	3.34	18.21	42.97	4.39
	R	28.67 - 39.83	2.73 - 4.28	14.22 - 22.49	35.00 - 48.95	3.72 - 5.39
7042	M	32.02	3.52	18.90	43.97	4.61
	R	25.57 - 37.16	3.02 - 3.82	13.30 - 23.49	34.63 - 56.58	4.09 - 5.33
7045	M	33.15	3.05	18.71	43.62	3.99
	R	27.01 - 39.74	2.65 - 3.58	14.26 - 22.70	33.81 - 53.29	3.54 - 4.63
7046	M	29.77	3.56	19.69	45.32	4.52
	R	27.20 - 39.75	2.88 - 4.57	15.18 - 23.43	36.49 - 51.78	3.63 - 5.71
7047	M	31.31	3.68	19.12	43.99	4.70
	R	25.35 - 36.16	3.01 - 4.42	14.93 - 21.29	37.73 - 53.76	4.08 - 5.53
7048	M	33.44	3.27	19.73	41.73	4.30
	R	27.06 - 44.91	2.38 - 3.95	15.50 - 25.21	29.62 - 50.37	3.28 - 4.97
7049	M	31.01	3.25	16.49	47.25	4.29
	R	20.56 - 34.55	2.34 - 4.37	8.95 - 20.73	42.83 - 65.80	3.33 - 5.69

Table 53. The Mean and Range of Values of the Chemical Analysis of Bacon as Obtained by the Fort Meade Medical Laboratory

Lot Number	Mean (M) and Range (R)	H ₂ O	Salt	Fat
7024	M	30.62	2.91	43.27
	R	25.30 - 35.00	2.40 - 3.50	38.40 - 51.90
7025	M	32.13	2.75	42.91
	R	28.40 - 36.20	2.10 - 3.30	36.10 - 50.40
7026	M	30.68	3.25	44.65
	R	27.10 - 34.10	2.20 - 3.80	39.00 - 50.90
7027	M	32.20	3.35	41.63
	R	25.20 - 37.20	2.60 - 3.80	31.80 - 53.40
7031	M	31.30	3.72	42.70
	R	25.90 - 35.80	2.90 - 5.60	34.60 - 51.20
7033	M	30.60	2.90	44.05
	R	25.60 - 35.20	2.40 - 3.30	38.50 - 52.20
7034	M	32.98	2.50	45.25
	R	28.90 - 38.60	2.10 - 3.00	36.00 - 51.00
7035	M	33.78	3.06	42.45
	R	29.60 - 40.40	2.40 - 3.70	29.60 - 49.70
7039	M	32.89	3.12	43.29
	R	27.50 - 38.50	2.30 - 3.70	36.30 - 52.30

Table 53. (Continued)

Lot Number	Mean (M) and Range (R)	H ₂ O	Salt	Fat
7040	M	32.54	3.42	42.75
	R	29.70 + 34.10	2.80 + 4.00	24.30 + 49.00
7041	M	31.39	3.31	43.84
	R	26.40 + 37.60	2.70 + 3.90	40.60 + 50.10
7042	M	31.76	3.43	45.24
	R	29.40 + 35.40	3.20 + 3.80	38.10 + 50.10
7045	M	32.94	3.16	44.28
	R	24.80 + 36.80	2.90 + 3.50	37.50 + 58.9
7046	M	32.36	3.10	45.05
	R	27.80 + 40.80	2.50 + 4.00	36.60 + 50.60
7047	M	31.57	3.32	42.52
	R	27.50 + 35.60	2.50 + 4.20	33.20 + 51.70
7048	M	33.36	3.20	43.89
	R	22.90 + 44.20	2.70 + 3.80	32.60 + 55.40
7049	M	33.37	3.27	43.84
	R	27.90 + 38.70	3.00 + 3.60	37.00 + 51.40

APPENDICES

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APPENDIX A

PROCESSING OF BACON

1. The raw material consisted of raw, unsmoked, rind-on pork bellies.
2. The rinds were mechanically removed then the lean, featherbones and glands were hand-trimmed.
3. The trimmed bellies were needle pumped with a 14 percent solution of salt, sodium nitrate, and sodium phosphate.
4. The pumped bellies were hung on a preweighed tree in groups of 66 bellies. The tree is reweighed before smoking. Each tree is labeled with the lot and tree number, weight range of the bellies, and weight of the tree.
5. Twenty trees were smoked at one time. The smoking procedure consisted of:
 - a. A rinse and dry cycle - 45 to 60 minutes.
 - b. A 42-percent smoke cycle - 3 hours.
 - c. A 32-percent smoke cycle to close surface of the belly - 60 minutes.
 - d. A 32-percent smoke cycle to bring the internal temperature to 53°C.
6. The smoked bellies were held at 0°C for 16 to 20 hours before pressing.
7. The pressed bellies were sliced to the desired thickness then cooked in a continuous-belt gas convection oven.
8. The cooked bacon was sorted onto parchment paper in 22-ounce lots, hand wrapped and placed into a No. 2-½ (401 x 411) size can. The can was evacuated and sealed.

APPENDIX B

MICROBIOLOGICAL PROCEDURES

Preparation of bacon. Prior to opening, the vacuum on each can was determined with a hand-operated vacuum gauge using sterile techniques. The bacon was then aseptically removed from the can and laid out on a sterile surface inside of a class 100 laminar-flow clean bench. A 50 g sample of bacon was obtained by cutting strips from the ends and the middle of the slab. The bacon was aseptically transferred to a sterile blender jar and blended with 450 ml of Butterfiled's⁹ sterile buffered water (SBW) for 2 minutes. This slurry constituted a 1:10 dilution. Appropriate tenfold serial dilutions were made by transferring 10 ml into 90 ml SBW.

Aerobic plate count. One milliliter of solutions ranging from 10^{-2} to 10^{-4} was pipetted into each of duplicate petri plates and poured with plate count agar. Plates were incubated at 35°C and counted after 48 hours.

Yeast and Mold Count. One milliliter of 10^{-2} and 10^{-3} dilutions was pipetted into each of duplicate petri plates and poured with potato dextrose agar acidified to pH 3.5. Plates were incubated at 23°C for five days before counting.

Coagulase-positive staphylococci. A surface plating procedure (APHA 1976)¹⁰ was used by distributing one milliliter of a 10^{-2} dilution equitably over triplicate plates of Baird Parker agar, (APHA, 1976)¹¹. The agar plates were dried overnight at 35°C. The inoculum was spread over the surface of the agar with sterile bent glass steaking rods. Plates were incubated at 35°C and examined after 24 and 48 hours for typical black, shiny convex colonies surrounded by a clear zone (AOAC, 1975)¹². Typical colonies were tested for coagulase production (AOAC, 1975)¹².

⁹ U.S. Department of Health Education and Welfare, Food and Drug Administration. Bacteriological Analytical Manual, 4th Edition; Appendix B: Reagents and Diluents. (1976).

¹⁰ American Public Health Association. The Compendium of Methods of Microbiological Examination of Foods. Marvin L. Speck, editor. Chapter: Methods for the isolation and enumeration of Staphylococcus aureus; Section: Surface plating procedure, Washington, DC. American Public Health Association. 701 pp. (1976).

¹¹ *ibid.* Chapter: Equipment, media, reagents, routine tests, and stains.

¹² Association of Official Analytical Chemists. Official Methods of Analysis, 12th edition. Chapter: Microbiological Methods; Section: Coagulase positive staphylococci. Washington, DC. Association of Official Analytical Chemists. 1094 pp. (1975).

The bacon remaining after sampling for microbiology was wrapped in foil then sealed in double plastic bags and delivered to the analytical chemistry laboratory.

APPENDIX C

CHEMICAL PROCEDURES

Preparation of bacon. One hundred grams of whole slices of bacon were randomly selected from each can for the water activity (Aw) test. The remaining bacon from each can was ground once through a hand meat chopper then mechanically blended until it was homogenous. All samples were held under refrigeration.

Chemical tests. Tests for moisture, protein, fat, salt, and ash were made in accordance with AOAC (1975)¹³ procedures. The test for salt was modified by using 0.1 N silver nitrate in lieu of 0.5 N solution. Water activity was determined as follows:

a. Apparatus

- (1) Dew point hygrometer, EG and G Model 880^a
- (2) Sensor for hygrometer (housed in leak-proof aluminum cup with two parts)
- (3) Oil free diaphragm pump, Borman-Rupp^b
- (4) Purge meter
- (5) Blender adaptor for Mason jars, Oster^c
- (6) Rubber stopper, Mason jar adapter (containing holes for inlet and outlet glass tubing and a thermometer)
- (7) Glass bulb precision thermometer or platinum digital thermometer accuracy to $\pm 0.1^{\circ}\text{F}$ required.
- (8) Stop watch and bubble meter (50 cc burnett containing Snoop^d)
- (9) Mason jars, pint and half-pint sizes
- (10) Rheostat, 100 VAC
- (11) Polypropylene tubing.

b. Procedure

- (1) Apparatus (pump, purge meter, sensor unit and blender adapter was assembled into an air-tight closed loop system). The pump was plugged into the rheostat and the sensor cable was plugged into the hygrometer.
- (2) The pump speed was adjusted with the rheostat to obtain a $1.26 \times 10^{-5} \text{ m}^3/\text{s}$ flow rate as determined with the stop watch and bubble meter.
- (3) Saturated salt solutions^{14,15} of known water activity were prepared

¹³Association of Official Analytical Chemists. Official Methods of Analysis, 12th edition, chapter: Meat and Meat Products, Sections: Moisture; Nitrogen; Crude Fat, Salt; Ash. Washington, DC: Association of Official Analytical Chemists. 1094 pp. (1975).

¹⁴L.B. Rockland. Saturated salt solutions for static control of relative humidity between 5° and 40°C. Anal. Chem. 32: 1375-1376 (1960).

¹⁵L. Greenspan. Humidity fixed points of binary saturated aqueous solutions. J. Res. (National Bureau of Standards) 81A: 89-96 (1977).

and used to check the initial calibration of the instrument and intermittently thereafter. The thick slurries were made from analytic reagent grade salts with distilled water.

Sodium chloride, $A_w=0.75$, and zinc sulfate, $A_w = 0.90$ at 20°C and 0.88 at 25°C were routinely used. Temperature control is critical in making A_w measurements.

(4) Sample jars containing 100 g of whole slices of bacon were uncapped and attached to the Mason jar adapter. The apparatus was activated and air flow adjusted to $1.26 \times 10^{-5} \text{ m}^3/\text{s}$. Dew point temperatures were read until the difference between successive readings was not greater than two percent.

(5) Both the dew point temperature from the instrument and the ambient temperature from the sample jar were read. The temperature from the instrument and the ambient temperature from the sample jar were read. The temperature readings were converted into corresponding water vapor pressures from tables found in most handbooks. The A_w was calculated as follows:

$$A_w = \frac{\text{Dew point vapor pressure}}{\text{Pure water vapor pressure of sample temperature}}$$

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^bBorman-Rupp Industries, Bellville, Ohio

^cArthur H. Thomas Co., 3rd at Vine, Philadelphia, PA 19105

^dNupro Co., 15635 Saramac Road, Cleveland, OH 44110